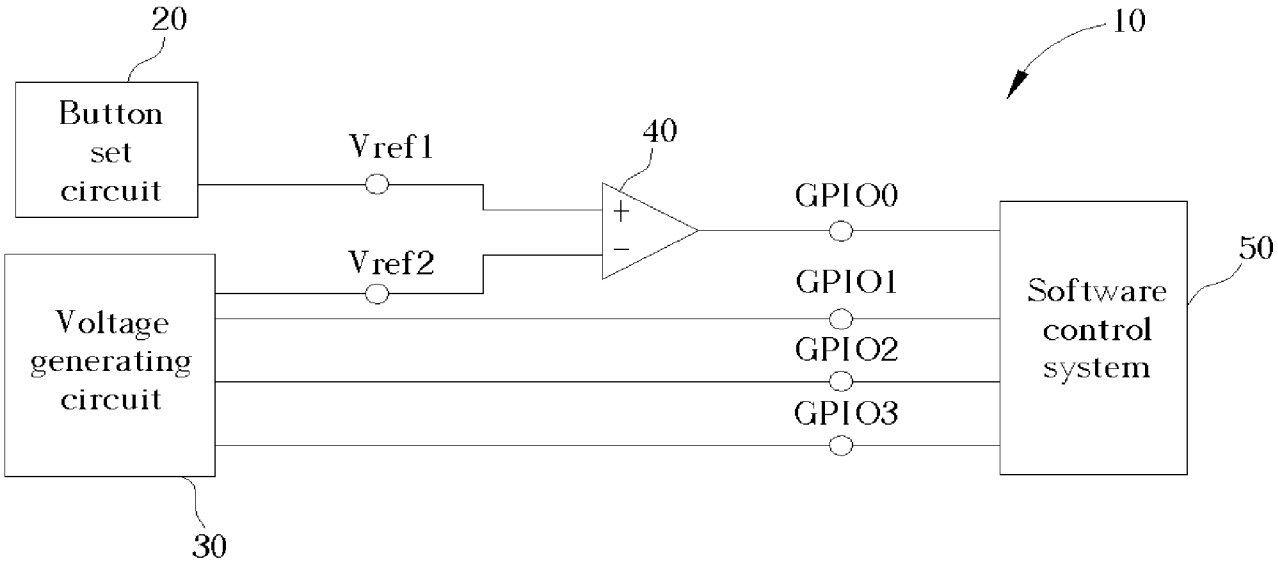
20
10
Button set circuit
Vref1
40
GPIO0
Vref2
GPIO1
Software control system
50
Voltage generating circuit
GPIO2
GPIO3
30

Fig. 1

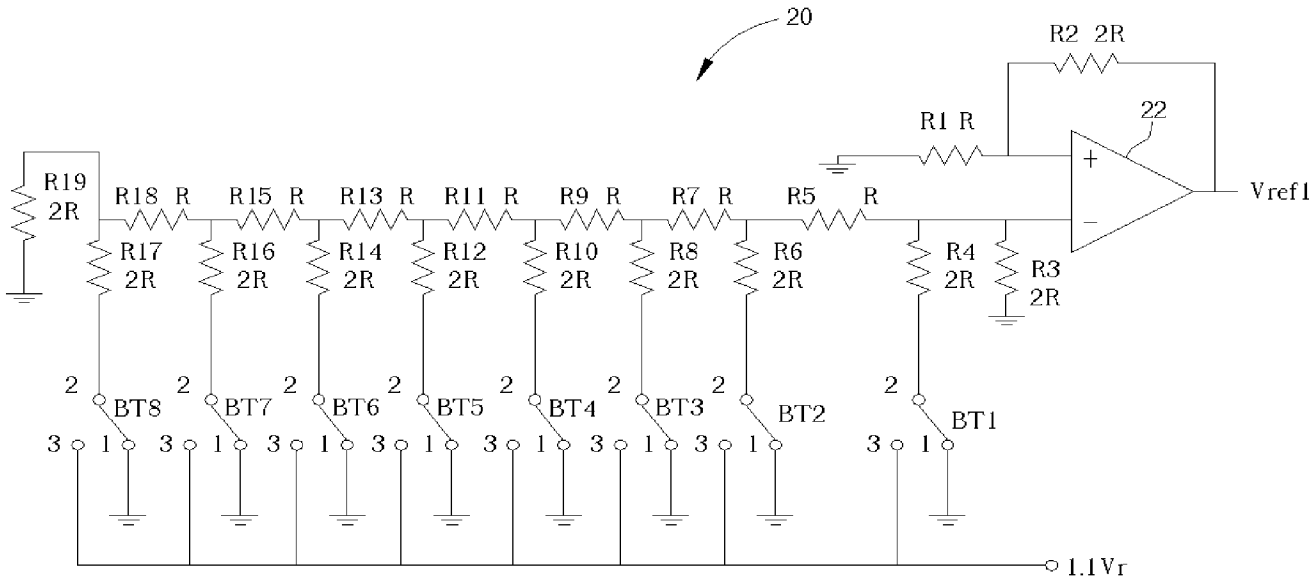
20
R2 2R
R1 R
22
R19
2R
R18 R
R15 R
R13 R
R11 R
R9 R
R7 R
R5 R
Vref1
R17
2R
R16
2R
R14
2R
R12
2R
R10
2R
R8
2R
R6
2R
R4
2R
R3
2R
BT8
BT7
BT6
BT5
BT4
BT3
BT2
BT1
1.1Vr

Fig. 2

Button pressed	Associated voltage
BT1	1.1Vr
BT2	1/2 x 1.1Vr
BT3	1/4 x 1.1Vr
BT4	1/8 x 1.1Vr
BT5	1/16 x 1.1Vr
BT6	1/32 x 1.1Vr
BT7	1/64 x 1.1Vr
BT8	1/128 x 1.1Vr

Fig. 3

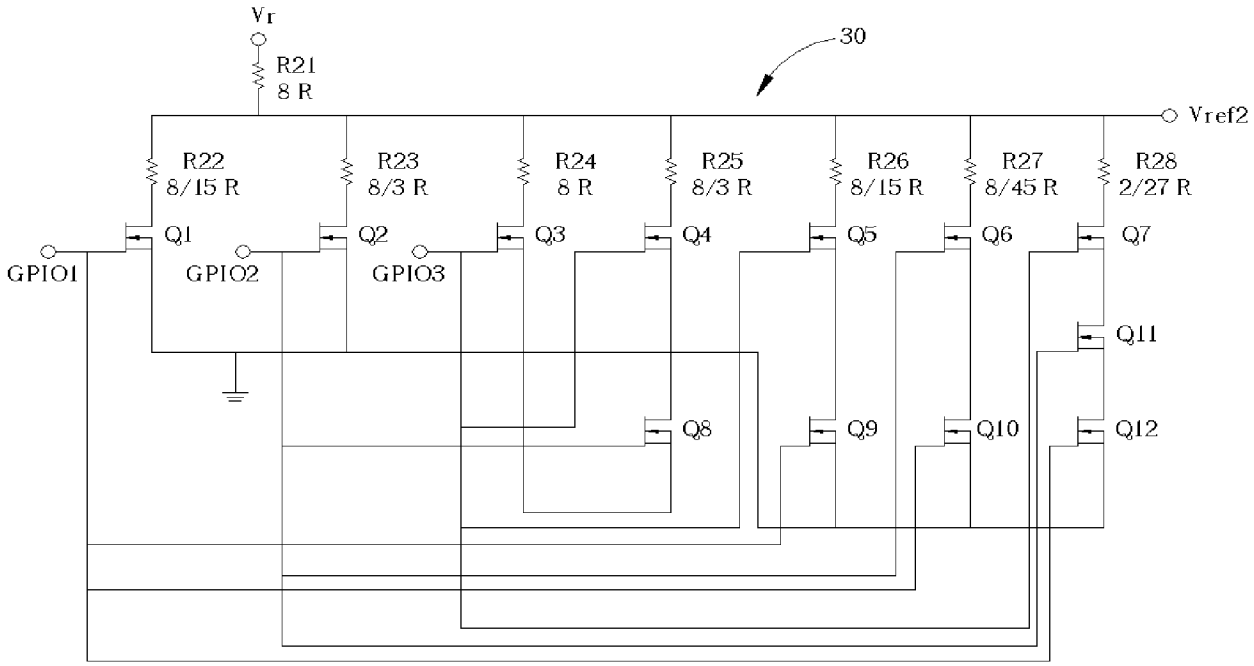
Vr
R21
8 R
30
Vref2
R22
8/15 R
R23
8/3 R
R24
8 R
R25
8/3 R
R26
8/15 R
R27
8/45 R
R28
2/27 R
Q1
Q2
Q3
Q4
Q5
Q6
Q7
GPIO1
GPIO2
GPIO3
Q11
Q8
Q9
Q10
Q12

Fig. 4

Button tested	GPIO1	GPIO2	GPIO3	GPIO0	Vref2 value
BT1	0	0	0	1	Vr
BT2	0	0	1	1	1/2 x Vr
BT3	0	1	0	1	1/4 x Vr
BT4	0	1	1	1	1/8 x Vr
BT5	1	0	0	1	1/16 x Vr
BT6	1	0	1	1	1/32 x Vr
BT7	1	1	0	1	1/64 x Vr
BT8	1	1	1	1	1/128 x Vr

Fig. 5

Row Num	BT1	BT2	BT3	BT4	BT5	BT6	BT7	BT8	Detected button
1	1	0	0	0	0	0	0	0	BT1
2	0	1	0	0	0	0	0	0	BT2
3	0	0	1	0	0	0	0	0	BT3
4	0	0	0	1	0	0	0	0	BT4
5	0	0	0	0	1	0	0	0	BT5
6	0	0	0	0	0	1	0	0	BT6
7	0	0	0	0	0	0	1	0	BT7
8	0	0	0	0	0	0	0	1	BT8
9	1	0	0	0	0	0	0	1	BT1
10	1	0	0	0	0	0	1	1	BT1
11	:	:	:	:	:	:	:	:	:
12	1	1	1	0	0	0	0	0	BT1
13	1	1	0	1	0	0	0	0	BT1
14	1	1	0	0	1	0	0	0	BT1
15	1	1	0	0	0	1	0	0	BT1
16	1	1	0	0	0	0	1	0	BT1
17	1	1	0	0	0	0	0	1	BT1
18	:	:	:	:	:	:	:	:	:
19	1	0	0	0	1	0	0	0	BT1
20	0	1	0	1	0	0	1	0	BT2

Fig. 6